

network in the way that is hypothesized under TELRIC. The existing physical infrastructure is not actually torn up and replaced with new network facilities. What differs between an actual forward-looking cost model and a TELRIC model is not what facilities an ILEC in fact uses to provide service, but instead what economic costs that ILEC can impute to the use of different network elements. The underlying economic idea of TELRIC has been to model what the element-by-element costs of a hypothetically efficient network would be (subject to current wire center locations), and then to say that those costs are the most that an ILEC can charge for the use of its existing network elements. TELRIC can therefore be thought of as an approach that attempts to revalue the existing network in an effort to reflect the economic effects — particularly any cost-reducing effects — of new technological developments.

21. If the Commission were to retain a replacement or “revaluation” approach to UNE pricing, then, as a theoretical matter, the correct way to do so would be to calculate the economic value of the ILEC’s network by determining the actual costs that would be incurred to put in place the ILEC’s existing network today. Unlike TELRIC, this would not require speculating about the costs of a new hypothetical network built from the ground up to replace the existing network. The model would instead be grounded in the ILEC’s actual network.

22. The network to be “revalued” could be determined in two steps. First, use available information to determine the ILEC’s existing mix of network facilities, technologies, and infrastructure using the existing network configuration, the actual sizes and increments of facilities (e.g., cable sizes), and other network characteristics. Second, that modeled network could be adjusted to take into account the changes that will occur in the ILEC’s network during the forward-looking period that the rates will be in effect, including, for example, any changes in the technology mix. Thus, for example, if an ILEC’s network currently has 70% copper and

30% fiber but the mix in the network is expected to be 65% copper and 35% fiber by the end of the forward-looking period, then the valuation could be based on the “average” mix during that period

23. This valuation serves as the starting point for use in determining the investment-related expenses (i.e., depreciation and cost of equity) that the incumbent will incur to provide unbundled elements during the period the rates are in effect. As I discuss below, the ultimate rates would have to include other relevant expenses, including the ILEC’s actual operating expenses and an appropriate share of its actual common overhead.

24. This approach is forward-looking because, to the extent the network today includes some new technologies and some older technologies, then the purchase price for those older technologies today will reflect whatever constraining effect the availability of the newer technology has on the price of the older technology. The approach recognizes that new, more efficient technology will, to some extent, constrain the value of the previous generation of technology. Because the amount of capital depreciation and the cost of equity included in the forward-looking cost calculation is based on this initial valuation, any reduction in the value of the current network that has occurred because of the constraining effect of new technologies will result in lower depreciation expense and cost of equity and therefore in a lower forward-looking cost. This is because depreciation and cost of equity are just percentages of an asset’s value, and as that value goes down so too does the amount of depreciation and cost of equity caused by any increment of use of that asset. As a result, calculating UNE prices based on the cost of replacing the current network at today’s prices would reflect any actual constraining effect that the introduction of new technologies has had in the marketplace.

25      The key difference between this approach and TELRIC is how they determine the value of the ILEC's existing network. TELRIC purports to value ILEC networks by attempting to calculate what it would cost to replace the ILEC's network with a new, hypothetical network built today to perform the functions of the ILEC's network. As I explained above, this extreme version of a "replacement cost" approach is economically unsound and sends incorrect price signals. The alternative approach suggested above is to base the economic value of the ILEC's network on how much it would cost to replace the actual mix of technology and equipment in the ILEC's existing network with its current design and configuration, taking into account how it will evolve over the period that rates will be in effect. This approach would have to account for all relevant replacement costs — not just the material costs — including the installation, engineering, and other transaction costs associated with deploying plant at the cost that would be incurred to perform those functions today.

26      Replacement costs of existing facilities may, however, be difficult to determine in some situations. If there were a well functioning secondary market in which different vintages of the relevant equipment were sold and in which equipment prices reflected the relative efficiencies of using different kinds of equipment, the prices in that theoretical market would be the appropriate measure.<sup>3/</sup> However, although there may be a secondary market for some facilities, the Commission in the past has not looked to those secondary markets, presumably on the ground that they are relatively limited. In many cases, therefore, recent purchasing experience is likely the best evidence of how much it would currently cost to purchase and

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<sup>3/</sup> If these secondary markets where the different vintages of equipment would be bought and sold were efficient, then the prices for the older vintage equipment, vis-à-vis new equipment would reflect the extent to which each is compatible with existing networks. In particular, the prices of older equipment would not decline as fast when the newer vintages are less compatible with other parts of existing networks.

deploy the existing facilities in the ILEC's network. For example, the ILEC's current switch purchase contracts or the recent weighted average or effective discount it has received are likely a reasonable basis for determining the current costs of purchasing switch capacity. Similarly, the costs an ILEC has incurred in recent periods to place buried cable are likely to be a reasonable predictor of the current costs to place the buried cable across the ILEC's actual network. Of course, the range of recent experience that is examined should be sufficiently broad that it constitutes a representative sample and takes account of variables such as geography and line density.

27      A second approach to establishing a basis for forward-looking economic costs of a network would be to estimate the actual total long-run incremental costs the incumbent will incur to add capacity to its network — that is, the average *unit* cost of the facilities mix the ILEC expects to add to the network over a reasonably long-run period going forward (including the appropriate portion of the fixed, shared, and common costs attributable to that element).<sup>4/</sup> This approach is similar to the replacement cost approach in that, as I discuss below, one would look to some of the same types of evidence (e.g., recent purchase contracts) to determine the relevant costs.

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<sup>4/</sup> For example, in his seminal work on the economics of regulation, Professor Alfred Kahn defines long-run incremental cost as follows:

...[T]he practically achievable benchmark for efficient pricing is more likely to be a type of average long-run incremental cost, computed for a large, expected incremental block of sales... This long-run incremental cost ... would be based on (1) the average incremental variable costs of those added sales and (2) estimated additional capital costs per unit, for additional capacity that will have to be constructed if sales at that price are expected to continue over time or to grow. Both of these components would be estimated as averages over some period of years extending into the future.

Alfred E. Kahn, *The Economics of Regulation*, Vol. I, at 85, The MIT Press, (1988).

28      This second approach, which might be appropriate where carriers are deploying substantially new technology in place of a precursor technology, would be akin to the “total service long run incremental cost” approach regulators have previously used. Under this approach, one could determine what facilities and technologies the ILEC expects to purchase over a reasonably long-term planning period and determine their costs on a per line (or other appropriate unit such as *minute of use or per mile*) basis. This approach would look to the actual costs the ILEC would incur to purchase and deploy the facilities and technology mix that the ILEC actually expects to buy. In order to capture the “total” costs, the study would then have to add to these incremental investment costs an economic assignment of fixed, shared, and common costs, such as for the associated network infrastructure, element-specific fixed costs, installation costs, and overhead. Thus, for example, the cost of a loop includes not only the incremental material cost of the copper or fiber and the incremental installation and transaction costs, but also pole and conduit costs. Similarly, in the case of switching, a “total service” cost of additional capacity would include an economic assignment of the initial costs associated with a switch, such as right-to-use fees and processor costs.

29.      Unlike the replacement cost approach, this incremental cost approach avoids some of the complexities and uncertainties inherent in calculating a replacement cost for the ILEC’s entire existing network or otherwise determining the economic value of that network as a whole. Instead, the focus is on the total long run *incremental* costs the ILEC will incur to add capacity to its network based on what facilities it expects to purchase and deploy over a long-term planning period. These long run incremental costs are then used to compute the per-line (or other unit such as *per minute of use or per mile*) cost of individual network elements by using them as the basis for investment-related expenses; those expenses, along with an economic

assignment of the incumbent's fixed, shared, and common costs and its actual operating expenses, are used to compute element prices. Both the market prices of the facilities the ILEC will purchase and the mix of facilities it will purchase necessarily will reflect any technological developments and the effect those developments have had on the value of the ILEC's existing facilities. Thus, for example, if a new, more efficient switching technology comes on the market, then ILECs' incremental purchases of switching facilities will include some amount of that new technology and/or the price at which they purchase the older technology will reflect whatever constraining effect the availability of that new technology actually has on prices of the older technology.

30 At the same time, unlike TELRIC, the incremental cost approach is still grounded in the ILEC's existing network since the mix of facilities and technologies that the ILEC will purchase going forward will necessarily be informed by its existing network configuration and technology. If a new technology is not compatible with the existing network infrastructure or will require expensive downstream changes in the ILEC's network, then the ILEC, acting efficiently, may not deploy that new technology or at least deploy less of it than would a carrier building a new network. Thus, for example, even if a carrier starting from scratch might deploy a substantial amount of a technology known as GR-303 as its switching interface, it may well be inefficient for an ILEC to do so because, among other things, using GR-303 might require it to incur additional costs such as changing other incompatible technologies in its network or developing new operation support systems.

31. This approach sends the proper economic signals to the CLEC: if the CLEC can deploy capacity more efficiently than the ILEC can add it, the CLEC will receive the price signal to rely on its own or other alternative facilities or technologies instead of UNEs provided by the

ILEC. Conversely, if in fact the ILEC's actual long run incremental costs are lower than any other alternative the CLEC has, then it may be efficient for the CLEC to use the UNE.

32. Moreover, focusing on the ILEC's expected and planned incremental investment avoids much of the hypothetical speculation associated with TELRIC. ILECs (as well as other carriers) typically have engineering and business plans concerning the types and quantities of facilities and technologies they expect to purchase and how they expect their networks to evolve over reasonable forward-looking planning periods. In addition, because ILEC networks typically evolve gradually, as with the replacement cost approach, recent purchase contracts and other similar experience should provide an empirical and accurate basis for determining the costs of adding capacity at least in the near future, as well as the fixed, common, and shared costs that are part of the total costs of providing an element

33. In estimating the ILEC's forward-looking costs, the "planning period" must be sufficiently long so that it produces a realistic picture of the ILEC's expected costs and is not distorted by short-term or one-time events. The planning period should be long enough so that it captures a sufficiently representative range of investments across different types of geographical, market, and similar conditions. At the same time, the planning period cannot be so long as to be entirely speculative or inaccurate. Given changes in technology and demand conditions, at some point the projections of what technologies will be used and at what prices would otherwise become too speculative to serve the purpose of accurately estimating costs. A reasonable time frame might be approximately 3 years, which also has the advantage of being the length of time that UNE prices generally have remained in effect before being reset.

34. The incremental cost approach has some potential drawbacks, however. For example, if the incumbents' planned deployments do not include some types of network plant or

technology because replacement of that technology will not be required in the near term, the incremental cost approach could inappropriately omit those network assets, even though they might be critical to the network. In addition, the approach may reflect a disproportionate number of deployments in newly developed areas, which may be limited to neighborhoods or business developments that lend themselves to a particular type of technology or architecture that would not be present throughout the entire network. Adjusting for such distortions might lead to the type of speculation that the incremental cost approach is intended to avoid. Another potential drawback of the approach is that where technology is new, it may be unclear how prices will scale with increased demand or what collateral costs a firm will incur to make the technology compatible with the rest of the network

35 Both the replacement and incremental cost approaches are entirely consistent with a “long-run” analysis. A long-run model should allow for the *possibility* that all inputs are variable. But it need not, and in the real world in most cases will not, assume that all inputs are in fact varied (and certainly not during the limited period that the rates will be in effect), even though it may be the case that in the theoretical long run, virtually all facilities presumably will be replaced someday. Before an existing input is varied, the firm must be able reasonably to predict *how* that input should be assumed to change in the model; *i.e.*, rationally to calculate what an input should vary *to*. Because technology in the telecommunications industry and demand conditions are changing over time, a carrier often will be able to make reasoned predictions about what the replacement technology and its associated costs will be only for a limited time into the future. As Professor Kahn has written: “In a world of continuous technological progress, it would be irrational for firms constantly to update their facilities in

order *completely* to incorporate today's lowest cost technology."<sup>5/</sup> At some point, the cost model becomes too speculative to serve the purpose of guiding efficient investment and pricing decisions. Indeed, permitting an analyst to look beyond the time in which reasoned predictions are possible adds nothing to the value or reliability of the cost study.

36 A long-run cost study in practice therefore can only have a limited time horizon. And, as I discussed above, it is not efficient to assume that all network facilities and inputs actually change from their existing state over that foreseeable period. Rather, a carrier minimizes its costs over the long run through incremental changes and investments, taking appropriate account of its existing facilities. The practical limits on foresight in a technologically dynamic environment mean that a firm might make a costly mistake by varying its inputs to the best that are foreseeable, only to find the costs of such technology stranded when a yet better technology comes along. Thus, an efficient firm, even while trying to make its cost study as long-run as possible, will be constrained to examine a finite period over which risk and uncertainty are efficiently managed but over which not all inputs may in fact be varied. Moreover, even if a carrier might be expected to replace most of its network facilities in the theoretical very long run, it will not do so during the more limited period in which the rates will be in effect, capturing the ILEC's actual forward-looking costs during that period requires looking to what is in fact used and how it is expected to vary during that period.

#### **B. Particular Inputs**

37. The approach I outlined above will enable regulators to determine the inputs used to set UNE prices based on objective, empirical data tied to the incumbent's actual network,

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<sup>5/</sup> Alfred E. Kahn, "Letting Go: Deregulating the Process of Deregulation," MSU Public Utilities Papers, at 91 (1998)

rather than the theoretical speculation that often accompanies the hypothetical nature of TELRIC. Specific, verifiable guidelines for these inputs are critical to ensuring that the resulting prices are based on the ILEC's actual forward-looking costs, and not other policy considerations such as creating a specific margin between UNE prices and retail rates. Moreover, grounding UNE prices in objective criteria based on the incumbent's existing network will provide a measure of certainty that is needed to promote investment by ILECs and CLECs alike. If an ILEC knows that it has a legitimate opportunity to recover its actual costs of providing an element — and not just some portion of those costs based on speculation about a hypothetical carrier — it will have a greater incentive to make investments in its network than currently exists. Likewise, CLECs that believe they can provide a service more efficiently than an ILEC will have the proper incentive to use alternative facilities or technologies without having to deal with the uncertainty that UNE prices might be set so far below the ILEC's costs that they might be better off relying on UNEs notwithstanding the availability of more efficient alternatives.

38. *Cost of Capital* As with other inputs, the cost of capital should send appropriate economic signals to incumbent LECs and competitive LECs alike. That can occur only if the cost of capital fully reflects the actual competitive and regulatory risks resulting from the provision of UNEs. In other words, the cost of capital should account for the investors' expectations of returns given the risks of investing in a company that provides UNEs in that company's competitive and regulatory environment. Thus, the cost of capital should not be based on regulatorily prescribed costs of capital, which were developed in the context of incumbent provision of local services in a largely monopoly environment. The Commission asks whether it should continue to use a competitive cost of capital if it reforms TELRIC so that network assumptions more closely reflect attributes of the incumbent's existing network rather

than the hypothetical network assumed under the current rules. *NPRM* ¶ 84. The short answer is that it should. Basing prices on the incumbent's existing network would not abandon the goal of setting prices that are consistent with those in a competitive market. Today, incumbents face substantial, and increasing, competitive risks with the growth of both intramodal and intermodal competitors including not only CLECs, but also wireless, cable, and voice over IP providers

39. As I described above, a cost of capital in the theoretical TELRIC world would be well above the normal competitive cost of capital because it would need to reflect the risks of investing in an unreal, hypercompetitive market where carriers set prices as though technologies were instantaneously and ubiquitously deployed. The reason is that investors would be understandably reluctant — perhaps unwilling at any price — to invest in a telecommunications company that was forced to price as though it rebuilt its network every few years. Thus, while reform of the pricing rules would mean that the cost of capital would no longer have to reflect the additional risks posed by TELRIC's current extreme assumptions, it still would have to reflect the risks of a competitive market (as well as the regulatory risks posed by the UNE regime itself).

40. Unfortunately, there is no “actual” cost of capital to which the regulator can look since there is no freestanding company whose sole business is providing UNEs. As a result, the regulator must look to some group of proxy companies. One specific, objective way to determine an appropriate cost of capital would be to take an average of the cost of capital of companies in competitive markets (such as a cost of capital based on companies in the S&P Industrials) as a starting point for the cost of capital of providing UNEs. This is an appropriate proxy because the S&P Industrials consist of a broad sample of companies whose average risk should reflect the typical risk a firm faces in a competitive market. It would also be relevant to

look to what cost of capital the ILEC — and its CLEC competitors — actually use to make discretionary network investment decisions, since that cost of capital would presumably reflect the relevant risks.

41. Of course, to the extent that the regulatory regime imposes additional risks not faced in a normal competitive market, the cost of capital must compensate for those risks. The UNE regime clearly poses at least some such risks. For example, CLECs are free to terminate their use of a particular element or of UNEs generally at any time, and instead move to alternative facilities or technologies. In fact, the risk is especially pronounced with UNEs, which are intended to be a transitional device to facilitate the move to alternative facilities or technologies; once that move is made and the end user customer's traffic is on those alternative facilities or technologies, the ILEC may well not recover the remaining value of its facilities that previously served that customer. In this sense, the risks of providing UNEs are equivalent to the risks of providing short-term, cancelable operating leases, such as a short-term car rental. Such leases involve significantly more risk than a typical long-term lease because the lessor bears the risk that its asset may sit idle or that rates may go down. That is particularly true where the assets in question are long-lived and the investment is sunk, as in telecommunications. Operating lease payments typically account for the value of the option to cancel the lease: the daily cost to rent a car from Hertz is much higher than the cost per day of a long-term car lease. The cost of capital used in setting UNE rates should similarly include the value of the CLECs' ability to cancel.

42. The cost of capital must also account for the risk incumbents incur by making irreversible, sunk investments. If UNE prices are based on costs without addition of an appropriate risk premium, then CLECs get a free ride on the investment risks taken by the

incumbent. CLECs can always choose either to use network elements or to provide service using alternative facilities or technologies or not to provide service at all. This discretionary demand by entrants for network elements is itself a source of uncertainty for incumbents trying to make efficient investment decisions. But, more importantly, if a proper risk factor is not added to the incumbent's costs, a CLEC can get the benefits of an incumbent's investments without bearing the full, risk-adjusted costs of those investments. For example, by making a significant investment in a new technology, the incumbent takes the risk that an even newer technology will come along that will render its investment obsolete and that it will not be able to recover the sunk costs of that investment. The CLEC using UNEs does not directly bear that risk, since it could always cancel the UNE and take advantage of that new technology. But the CLEC would, of course, have to bear the costs of those risks if it were making its own network investments. Accordingly, if UNE prices do not incorporate a risk premium to reflect the regulatory risks arising from the CLEC's option, the CLEC would have incentive to exercise its free "option" to rely on the incumbent's investment rather than to build its own facilities, and the CLEC's investment decision would be distorted away from facilities-based competition. This would be contrary to the goal of providing efficient market entry incentives.

43     *Depreciation* Proper forward-looking depreciation rates should be set to recover the economic value of a facility over the time period that the facility is expected to continue to have economic value. To do so, depreciation lives, like the cost of capital, must account for the actual risks ILECs face in providing UNEs and the effect that competition and technological developments have on the economic lives of facilities. The best starting point for capturing these factors are a carrier's GAAP lives. Such lives are based on the expected future period during which an element will produce economic benefit and are therefore intrinsically forward-looking.

They also are updated periodically to reflect changes in technology, competition, and other factors that may alter the period during which the asset will have economic value. Moreover, GAAP lives are a relatively objective and transparent measure of depreciation lives since they are used by ILECs for financial reporting and other purposes. Incumbents have no incentive to understate their GAAP lives since doing so would translate into higher expenses, lower earnings, and potentially lower stock prices

44 The only real alternative to GAAP lives that CLECs, and some state commissions, have advocated is regulatorily prescribed lives, such as those the FCC set in 1995 and 1999. But in a marketplace where technology has continued to evolve and facilities-based competition is rapidly increasing, there is no reason that lives set in 1995 or 1999 — and that do not account for the widespread competition and technological innovation that has occurred since then — will necessarily be forward-looking or accurate today. In order for depreciation costs to send correct economic signals to CLECs today, they must reflect the best current estimate of how long assets will have economic value. GAAP achieves this goal because it requires that lives be periodically updated. Depreciation lives that are too long because they are based on outdated information will encourage CLECs to rely on UNEs when it would be more efficient for them to rely on alternative technologies. Moreover, even if depreciation lives are correct, there is still a question about what the pattern of depreciation should be. Economic depreciation does not necessarily occur in a straight line and may accelerate in the early life of an asset and flatten out later.

45. *Switching* In determining the investment costs associated with UNE switching, the regulator should look to what mix of switching equipment an ILEC is expected to purchase going forward, and determine the prices the ILEC expects to pay for that equipment. Because the price of switching equipment is often expressed as a discount off list price, those prices

should reflect the effective or weighted average discount that the ILEC receives. It is important to recognize that in determining the total per-line investment cost of switching capacity, it is necessary to include *all* relevant costs, including the appropriate portion of fixed, shared, and common costs. In particular, carriers typically incur certain initial costs in connection with purchasing and deploying a new switch (e.g., right-to-use fees and processor capacity) that they may not incur with every subsequent purchase of replacement components and growth additions for that switch. In effect, those initial switch costs are incurred for purposes of all lines that will be served by that switch, including capacity that will subsequently be added to that switch. Accordingly, the “total” cost of switching capacity includes an assignment of these initial costs, as well as other fixed, shared, and common costs.

46. Determining investment costs based on the ILEC’s expected purchases has the advantage of reflecting the economic calculations a rational switch manufacturer would also make: a manufacturer looking to recover its costs must forecast demand for its products and ensure that its total revenue will be adequate based on the mix of switches it expects to sell — thus, it in effect must determine an average “revenue requirement” and set prices accordingly. Indeed, Verizon’s vendor switching contracts stipulate prices based on a certain revenue commitment determined on the basis of projected equipment purchases. It makes no sense simply to ask what it would cost to replace the ILEC’s existing switching capacity with all new switches bought at today’s new switch discount. To the extent that switch manufacturers offer incumbents extraordinarily high discounts on the few new switches purchased today, they do so because they expect to sell them few new switches, manufacturers sell growth additions and replacement components at higher prices knowing that they will sell mostly those types of switching equipment. But if the switch manufacturer expected to sell a different mix, it still

would set prices to produce the necessary revenues from the mix of switching equipment it expected to sell. If incumbents were expected to buy more new switches and fewer pieces of growth equipment and replacement components, then manufacturers would necessarily use a different pricing structure to recover more of their costs from new switches. Thus, the average cost of switching capacity is unlikely to change (holding other factors such as technological development constant). If the expected mix of switch equipment that carriers purchase were different, then the prices/discounts also would be different because, in order to remain economically viable, manufacturers must still receive that same average revenue to recover their costs and make a reasonable profit. This might be thought of as a form of “life cycle” cost for switching capacity. Of course, in this case, life cycle doesn’t mean the cost of an individual switch (including a new switch and any growth additions and replacement components) over the life of that particular switch, but rather the price that the switch manufacturer will try to recoup over the range of what it expects incumbents to purchase. Thus, the investment cost of switching capacity is best measured based on the actual mix of switching equipment that manufacturers expect the incumbents to purchase going forward.

47. This investment cost, as well as the ILEC’s actual operating expenses associated with switching, should be recovered in the same way they are incurred. In other words, UNE switching prices should be usage-based to the extent that switching costs are traffic sensitive. Recovering traffic-sensitive costs through flat-rate prices would be economically incorrect for several reasons. First, users of unbundled switching would have no incentive to modify usage as costs rise. Second, high-volume users would have their consumption subsidized by lower-volume users forced to pay the same fixed charge. Third, comparisons of the relative benefits of buying unbundled switching versus using alternative facilities or technologies would be skewed.

Thus, switching costs should be appropriately allocated between port and usage charges, with the usage rate based on the average actual minutes of use the ILEC experiences on its network.

48. *Loops.* In terms of the mix of loop technologies (copper v. integrated digital loop carrier v. universal digital loop carrier), the basic principle should be to look to the mix that the ILEC itself expects to use. The incentives created by price caps and competition give ILECs strong reasons to pursue rational and efficient deployment strategies. Thus, for example, the mix of integrated digital loop carrier and universal digital loop carrier that the incumbent uses is presumably the long-run cost minimizing decision given the incumbent's network and the services it expects to provide. Similarly, if the incumbent has not deployed and does not expect to deploy a technology associated with integrated digital loop carrier known as GR-303, then the ILEC's forward-looking costs should not reflect that technology. This is an entirely appropriate result, even if a carrier starting from scratch might use at least some GR-303. The ILEC's decision reflects factors that might not affect a hypothetical carrier starting from scratch, such as whether GR-303 is compatible with existing network technologies and operation support systems. To the extent that an entrant could provide service more efficiently than the ILEC by using GR-303, setting UNE prices based on the ILEC's technology mix would send the appropriate economic signals that would encourage the entrant to do so.

49. As with switching and other elements, the total investment cost for the loop would include an economic assignment of fixed, shared, and common costs associated with the loop, such as the cost of the relevant structure (e.g., a pole) and placement. The recent costs the ILEC actually incurred to purchase individual copper loops, integrated digital loop carrier, and universal digital loop carrier would be the appropriate starting point for determining the average unit cost for each type of loop technology.

50. Beyond the technology mix, many inputs for determining loop costs should be based on the characteristics of the incumbent's network (as it will change over the forward-looking period). Thus, for example, the ILEC's actual forward-looking loop costs will reflect not only the location of the existing wire centers as under TELRIC, but also available information concerning the route configuration and average loop length in the ILEC's actual network. Similarly, the structure mix (i.e., the relative percentages of aerial, buried, and underground cable) should reflect the mix in the ILEC's existing network. In terms of structure sharing — that is, the degree to which electric companies and other utilities might use the same poles or other structures to run their cables and accordingly share the structure costs with the ILEC — the proper and objective measure is the degree of sharing the ILEC itself has experienced, not speculation about how much sharing would occur in a hypothetical world where carriers and other utilities were all building networks from scratch at the same time in the same places. As with other characteristics of the incumbent's network, the incentives created by price caps and pressures from intermodal and intramodal competitors provide strong reason to believe that these attributes of the incumbent's network reflect efficient choices. And to the extent that a carrier building facilities today could deploy a network with a more efficient configuration, setting UNE prices based on the ILEC's network will send the proper economic signals to that CLEC.

51. *Utilization or Fill.* For purposes of calculating UNE prices, the fill produced by the cost model should correspond with the real world achieved fill in the incumbent's network. The fill in a network is the product of a number of competing considerations. On the one hand, I understand that a certain amount of spare capacity is necessary in an efficient, real-world network, among other things, to maintain service quality, accommodate repair and maintenance

needs, deal with customer churn, respond efficiently to increases in demand (such as orders for second lines), and avoid the inefficiencies of repeated installation expenditures when a single up-front expenditure would have been more economic. At the same time, ILECs have strong incentives to keep fill as high as possible by minimizing spare capacity. A higher fill for a particular facility increases revenues from that facility, and incumbents clearly have every reason to maximize revenues from their existing facilities. That is particularly true given the incentives created by price caps and competitive pressures from other facilities-based carriers such as providers of cable telephony, wireless, voice over IP, e-mail, and instant messaging services; the incumbent would have no reason to have “excess” spare in its network since that would increase its investment costs without providing corresponding increased revenues.

52. In light of the relevant incentives, there is every reason to believe that the existing average fills in the incumbent’s network for each type of plant (fiber feeder, copper feeder, distribution cable) are the product of efficient and sound engineering guidelines that best balance the relevant considerations and unavoidable real world constraints. Conversely, there is no reason to believe the average fill for the same type of plant will increase in the reasonably foreseeable future. If anything, fill may well decrease in the future, as the continued development of competition will result in more and more traffic being diverted to other facilities-based competitors. Given the fact that fill is likely to stay stable or decrease (and less likely to increase), it would be unreasonable, as some have suggested, to base UNE costs on speculation about whether fill might be higher in some hypothetical ideal network.

53. Thus, from an economic perspective, it is entirely appropriate to base UNE prices on the average existing fill in the incumbent’s network. Indeed, given that any entrant would be subject to the same competing considerations that determine the efficient level of fills, there is

every reason to believe that over time, any competitor that had to build a network to serve demand similar to the incumbent's would have fill similar to those of incumbents for corresponding types of facilities. In any event, basing prices on the ILEC's real world fills will again send appropriate economic signals. To the extent a CLEC can provide service with less spare, while still meeting applicable service quality requirements, it should be encouraged to rely on its own facilities rather than UNEs.

54     *Operating expenses.* The proper measure of operating expenses for specific types of facilities, e g., copper cable, telephone poles, etc. is the actual out-of-pocket cash outlays the ILEC will make in connection with providing UNEs. Because price caps and competition have given the ILEC every incentive to be efficient and to reduce these expenses, its actual cash expenditures are the proper benchmark for forward-looking costs. And they send the appropriate price signals to CLECs since, if they can operate more efficiently, they should be encouraged to rely on their own networks rather than on UNEs.

55     *Non-recurring costs.* As with operating expenses, the proper measure of non-recurring costs are the actual out-of-pocket costs incumbents will incur to make unbundled elements available to CLECs. Most non-recurring costs are for labor. Thus, the appropriate approach to calculate the relevant non-recurring costs is to (1) determine what tasks an ILEC may perform to process and provision an order for a particular element or service, (2) measure how much time will be needed on average to perform each of those tasks (taking into account the probability that the task will in fact need to be performed with respect to a particular order), (3) multiply each such time by the applicable labor rate, (4) add together the resulting costs for the tasks relevant to a particular element, and (5) then add an economic assignment of joint, common costs and other expenditures associated with these activities

56. Basing non-recurring rates on the actual non-recurring activities in which ILECs will engage to provision CLEC orders is economically correct. Conversely, it would simply be incorrect to ignore some of the labor costs ILECs incur because they ultimately may be reduced or eliminated as the network evolves. For example, some states have determined that ILECs should not be entitled to recover their costs for qualifying and conditioning a loop so that a CLEC can use it to provide DSL on the theory that in some ideal hypothetical network, such activities might not be necessary. That makes no sense. ILECs do in fact incur those costs today — for example, they pay workers for the time needed to condition the loop. So the only real question is who should bear those costs — the ILEC or the CLEC. Clearly, the answer to that question is the CLEC. The CLEC causes the cost, which is incurred on its behalf. To insulate the CLEC from this cost would send improper economic signals; if the CLEC does not bear the full costs of providing a service (e.g., DSL) to a customer, then it inevitably will make inefficient entry decisions by, for example, relying on a UNE loop to provide DSL instead of an alternative facility or technology, whether by deploying its own facilities, investing in wireless technology, or forming alliances with other providers.

57. The mere existence of new technology that might reduce or eliminate the labor time needed for non-recurring activities does not affect the costs of performing those activities on existing plant. This is a key distinction from recurring costs, where, as noted above, the *mere existence* of more efficient technology constrains, and may reduce, the economic value of existing facilities. But a lower capital value does not reduce or eliminate the labor time needed to perform non-recurring activities on existing plant.

58. Nor is there reason to believe that ILECs have had (or will have) incentives to act inefficiently with respect to non-recurring activities. To the extent that non-recurring activities

involve similar systems and processes for retail and wholesale customers, price caps and competitive pressures create strong incentives for ILECs to design and perform these activities efficiently. Thus, for example, an ILEC must make field dispatches to provision some orders for both its retail and wholesale customers, and it has strong reason both to minimize the frequency with which those dispatches must be performed and the time needed to perform them. With respect to activities performed solely or primarily for wholesale customers, in most cases the underlying processes have been developed in the context of collaborative proceedings with the participation of CLECs and regulators, who obviously have every reason to ensure that such activities are as efficient as possible. In other cases, the uniquely wholesale processes are automated activities that ILECs have had to develop to interface with CLECs' systems and interfaces that are used to submit orders — processes that again are developed in close conjunction with the CLECs and that generally are highly automated and subject to performance metrics and potential penalties.

59. In any event, even absent such oversight and participation, ILECs would not have an incentive to act inefficiently and increase their costs with respect to non-recurring activities. Once a state sets non-recurring rates, ILECs obviously have every reason to be as efficient as possible during the time the rates are in effect, since inefficient processes would only increase the ILECs' costs without any corresponding increase in their revenues or CLECs' costs. Thus, any concern that an ILEC would purposely act inefficiently to increase CLECs' costs requires hypothesizing that an ILEC will suddenly start acting inefficiently when a state is going to launch a proceeding to set new rates so that its "actual costs" look higher at the time and the state sets higher rates, after which the ILEC could then return to its more efficient processes until the next time rates were reset. There is no reason to believe an ILEC could or would engage in such

behavior, particularly given the obvious risks of detection. Such far-fetched hypothetical speculation about how a carrier might purposefully seek to engage in anticompetitive actions is not a reason to depart from the economically correct way of setting non-recurring rates. In any event, ILECs' non-recurring work times today should be presumed efficient because states have set non-recurring rates based on TELRIC that have not allowed ILECs to recover more than a small fraction of their actual non-recurring costs. In such circumstances, ILECs clearly have had every incentive to make their non-recurring costs as low as possible.

60. Finally, although some have suggested that non-recurring costs should be recovered through recurring rates because doing so would lower purported "entry barriers," that would be improper from an economic perspective. When a CLEC places an order, it causes these costs to be incurred and should properly bear them. Attempting to recover non-recurring costs through recurring rates in effect shifts the risk of non-recovery from the CLEC to the ILEC, since the customer might change providers or no longer require service before it has fully paid for the non-recurring costs. The effect would be to make the ILEC the CLEC's banker: the ILEC would be extending credit to the CLEC for immediate cash outlays and recover that cost only through periodic payments over time. Such cost-shifting would mean that the CLEC does not bear the full costs of providing service, and it will receive improper economic signals since the ILEC (and, as explained below, other CLECs as well) would be forced to subsidize a CLEC that goes out of business or disconnects some lines prior to paying a sufficient amount through recurring rates to cover the non-recurring costs of setting up the line in the first place. In addition, non-recurring costs, unlike recurring costs, are one-time costs incurred in response to a specific order by a specific cost-causer and involve easily identifiable, concrete out-of-pocket expenses. Recovering such expenses through recurring rates requires estimating how long the

average customer will take service — an uncertain exercise at best that almost inevitably will create a substantial risk of underrecovery for the ILEC.

61. If ILECs were obligated to bear the inherent risk of underrecovery that would be involved if non-recurring costs were recovered through recurring rates and the ILEC was accordingly lending capital to the CLEC, recurring UNE rates would have to include an additional risk premium to compensate for this financial risk. Moreover, shifting non-recurring costs (and this risk premium) to recurring rates paid by all CLECs would impose unwarranted costs on competitors that do *not* benefit from the non-recurring tasks that their fellow CLECs demand, while subsidizing those CLECs that do consume a greater portion of non-recurring labor. Such an approach would require competing carriers with efficient business plans that impose fewer non-recurring costs to subsidize the operations of other carriers who are less efficient and cause greater non-recurring costs.

62. Requiring CLECs to pay non-recurring charges for the non-recurring costs they cause does not create an unwarranted entry barrier. Such costs are a real, up-front cost of acquiring customers that a carrier should rightly bear. Of course, both CLECs and ILECs are free to decide how to recover these costs from retail customers and may choose *not* to impose an up-front connection fee. But the fact that an ILEC may choose not to impose a non-recurring charge on its *retail* customer does not mean it should not be able to recover that cost from the CLEC. In the case of retail service, the ILEC is still bearing the non-recurring cost — it is simply making a business judgment as to how best to recover that cost in light of market conditions. Similarly, where the CLEC causes a non-recurring cost in connection with an order, it should bear that cost (by paying the appropriate non-recurring charge to the ILEC), and then it too can make a business judgment about how best to recover it. Shielding the CLEC from these

real costs of doing business would send incorrect economic signals: if the CLEC cannot cover its customer acquisition costs from the services it provides to customers, its entry may not be economically rational and should not be subsidized.

#### **IV. Productivity Factors**

63. The Commission should not adopt general “productivity factors” to adjust UNE prices over time in lieu of conducting a full UNE pricing proceeding. *NPRM* ¶ 139. As I explain above, the best way to achieve the Commission’s UNE pricing goals is to tie UNE rates to the incumbent’s real-world, forward-looking network costs based on the incumbent’s actual technology and routing choices and its actual operating expenses. A standardized productivity factor would not reflect the incumbents’ actual costs, and thus would undermine the Commission’s stated goals. A requirement to adjust rates using productivity factors assumes that costs will always and regularly decrease, but there is no sound basis for such an assumption. As only one example, I understand that labor rates continue to increase, which would increase the costs for many UNEs. Nor is there any basis to assume that investment costs and expenses, even if one or both are decreasing, would do so at the same rate.

64. Thus, the determination of productivity factors would be inherently speculative and complex. Different elements will have varying productivity gains over the planning period depending, for example, on the different types of technologies deployed and the amount of automation already involved in provisioning a particular element. Different elements would, therefore, require different productivity factors. As a result, a regulator would have to determine an appropriate productivity factor for *each* element. These determinations would have to be made separately for each state and each incumbent within the state. Moreover, there is no reason to believe that a productivity factor would stay constant over time; thus, those factors would have to be revisited and adjusted on a periodic basis. Thus, determining productivity factors would

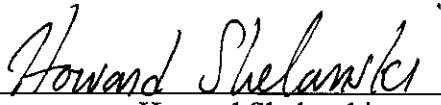
deteriorate into even more hypothetical assumptions and standardless “black box” exercises capable of producing any desired result.

65. This concludes my declaration.

### **Declaration of Howard Shelanski**

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 12<sup>th</sup> day of December, 2003.

  
Howard Shelanski

**HOWARD A. SHELANSKI**

School of Law, Boalt Hall  
University of California  
Berkeley, CA 94720  
shelanski@law.berkeley.edu  
(510) 643-2743

**ATTACHMENT A**

**Current Position**      **University of California at Berkeley, School of Law**  
Professor of Law, and Co-Director, Berkeley Center for Law and Technology.  
Teaching areas include antitrust law, telecommunications law, regulated industries, and contract law.

**Experience**            **Federal Communications Commission, Washington, D.C.**  
Chief Economist. 1999-2000.

**President's Council of Economic Advisers, Washington, D.C.**  
Senior Economist, responsible for issues of industrial organization, competition policy, regulation, and trade, 1998-99.

**Kellogg, Huber, Hansen, Todd & Evans, Washington, D.C.**  
Associate, telecommunications and general litigation practice, 1995-97.

**Law Clerk to Justice Antonin Scalia, United States Supreme Court,**  
1994-95.

**Law Clerk to Judge Louis H. Pollak, U.S. District Court, Eastern District of**  
Pennsylvania, 1993-94.

**Law Clerk to Judge Stephen F. Williams, United States Court of Appeals, D.C.**  
Circuit, 1992-93.

**Education**            **University of California at Berkeley, Economics Department**  
Ph.D. 1993; M.A. 1989  
Dissertation: "Transfer Pricing and the Organization of Intrafirm Exchange."

**University of California at Berkeley, School of Law (Boalt Hall)**  
J.D. 1992; Order of the Coif  
Senior Articles Editor, *California Law Review*

**Haverford College, Pennsylvania**  
B.A. (history) with high honors, 1986  
Phi Beta Kappa; varsity track and cross country

**Other**                    Speak French and Spanish;  
Enjoy brewing beer, outdoor sports, travel, and jazz;  
Admitted to the Bar in the District of Columbia and in Pennsylvania.

**Selected Research &  
Publications**

(With Peter Klein) "Empirical Research in Transaction Cost Economics: A Review and Assessment," 11 *Journal of Law, Economics, & Organization* 335 (1995).

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